

DISCUSSION OF THE AMENDMENT

The status of U.S. patent application 10/061,147 has been updated.

The Abstract has been replaced with a shorter Abstract.

The claims have been amended to recite a gas pressure range of from 40 to 70 bar, as supported by the two end points 40 and 70 in Table 1 at page 38 of the specification. Claims 3 and 20 have each been amended by deleting “preferably methane”. New Claims 35 and 36 have been added to claim the subject matter deleted from Claims 3 and 20, respectively. The method claims have been amended by incorporating the transitional phrase --comprising-- therein. The term “and” has been replaced with --or--, where appropriate. Claims 7 and 24 have been amended by inserting appropriate Markush terminology and correcting a typographical error. Claims 14 and 31 have been amended by deleting the superfluous “at least one”. Finally, all the independent claims except Claim 1 have been amended into dependent claims, to the extent these claims require the container claimed in Claim 1.

No new matter is believed to have been added by the above amendment. Claims 1, 3-18 and 20-36 are now pending in the application.

REMARKS

As recited in above-amended Claim 1, the present invention is or uses a container for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 40 to 70 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.

The rejections of Claims 9-14, 16 and 17 under 35 U.S.C. § 102 as anticipated by JP 9-227572 (JP '572); DE 20210139 or its U.S. equivalent 6,929,679 (Muller et al),¹ or EP 0727608 (EP '608), are respectfully traversed.

JP '572 discloses an organometal complex capable of storing gas, which is composed of a divalent metal ion, a bidentate organic ligand having atoms coordinated to the above metal at both terminals of the rigid skeleton and 2,3-pyrazine carboxylic acid, and a gas storage device employing the organometal complex. However, based on Figure 2 therein, the maximum storage pressure obtained appears to be 30 kg/cm², which is equivalent to 30 bar. Thus, JP '572 does not anticipate, nor does it otherwise suggest the presently-recited range of 40 to 70 bar.

Muller et al discloses uptaking, storing, releasing, etc. at least one gas using an agent comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to the metal ion. However, as Applicants disclose in the specification at page 2, lines 27-29, neither specific

¹ Discussion of Muller et al in the text is to the U.S. equivalent thereof.

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containers nor container materials nor specific container geometries nor specific pressure ranges under which the gases are stored are disclosed in Muller et al. Moreover, the only pressures disclosed by Muller et al are significantly lower than the presently-recited range of 40 to 70 bar. Indeed, as described in Example 2 and shown in Fig. 3 therein, hydrogen pressures of about 150 mbar (0.150 bar) are used (column 6, lines 10-17). Thus, Muller et al does not anticipate, nor does it otherwise suggest the presently-recited range of 40 to 70 bar.

EP '608, which was cited in the International Search Report for a corresponding international application as an "A" reference, i.e., not considered to be of particular relevance, relates to a gas storage apparatus for use in storing a gas including methane wherein no pressures greater than 36 kg/cm² (36 bar) are described (page 12, lines 27-28). As described in the specification at page 2, lines 1-4, the complexes disclosed in EP '608 are difficult to synthesize, and their storing capacity is low, if not too low to be industrially applicable. EP '608 does not anticipate or otherwise render the presently-claimed invention unpatentable.

For all the above reasons, it is respectfully requested that these rejections be withdrawn.

The rejection of Claims 1-8, 15 and 18-34 under 35 U.S.C. § 103(a) as unpatentable over either one of JP '572, Muller et al, or EP '608, each in view of U.S. 6,432,176 (Klos et al), is respectfully traversed. Klos et al has been relied on for its disclosure of cylindrical as well as non-cylindrical containers for gas storage (column 2, lines 39-49). The Examiner further finds that storage pressure is considered to be a parameter that would have been routinely optimized by one having ordinary skill in the art and therefore, recited pressures in the claims would have been obvious.

In reply, and as discussed above, the claims now require a storage capability at a pressure of from 40 to 70 bar inside the container. It is well known that the amount of gas

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storable in a container is related to the pressure, i.e., the greater the pressure, the greater the amount of gas that can be stored. Such is also true when a metallo-organic framework material is present in such a container. Table 1, at page 38 of the specification, details a comparison of Example 2, which is a comparative example in that it does not contain the framework material of the present invention, with Example 3, which is according to the present invention. Table 1 shows gas storage capacity as a function of pressure with pressures ranging from 3 up to 100 bar. As shown therein, at 100 bar, the capacity ratio for Example 3 divided by the capacity ratio for Example 2 is at its lowest, thereby diminishing the incentive for the inclusion of the framework material. Thus, it was surprising to find that a sufficiently high capacity could be obtained in the container within a pressure range of from 40 to 70 bar. None of the applied prior art discloses or suggests the use of such a pressure range for the storage of at least one gas in a container when the container is filled with a metallo-organic framework material.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejections on grounds of nonstatutory obviousness-type double patenting of Claims 1, 2 and 4-17 over Claims 1 and 4-15 of Muller et al, and of Claims 18, 19 and 21-34 over Claims 1 and 4-15 of Muller et al in view of Klos et al, are respectfully traversed. The disclosures and deficiencies of Muller et al and Klos et al have been discussed above. The above-referenced claims of Muller et al are no more relevant than the disclosure therein as a whole. Thus, for essentially the same reasons as argued above with regard to the rejections over Muller et al under 35 U.S.C. § 102, and over Muller et al in view of Klos et al under 35 U.S.C. § 103(a), it is respectfully requested that these rejections be withdrawn.

The objection to the Abstract is now moot in view of the above-discussed amendment. Accordingly, it is respectfully requested that the objection be withdrawn.

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All of the presently-pending claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

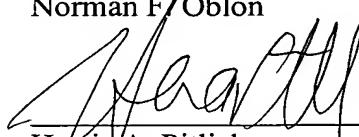
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